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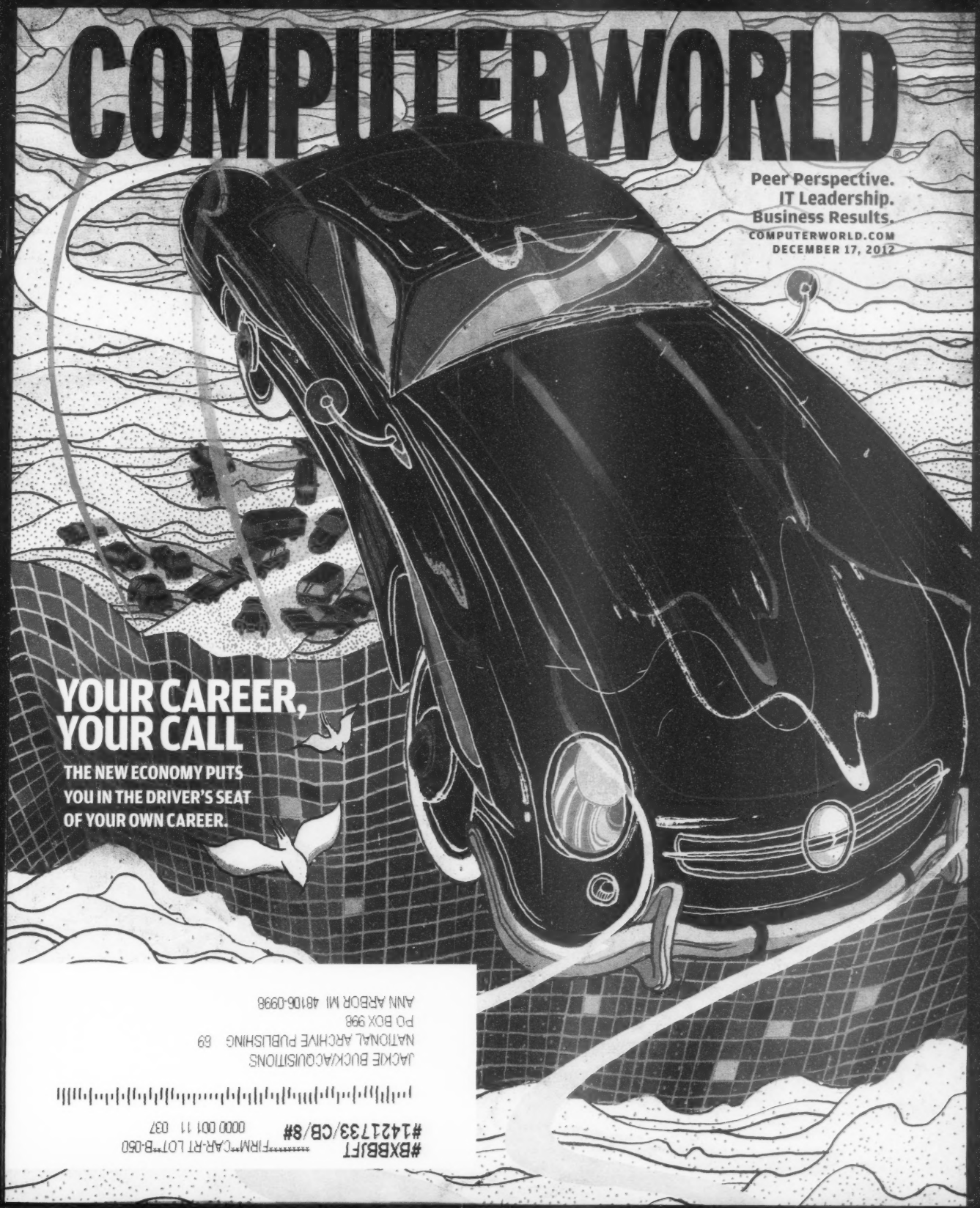

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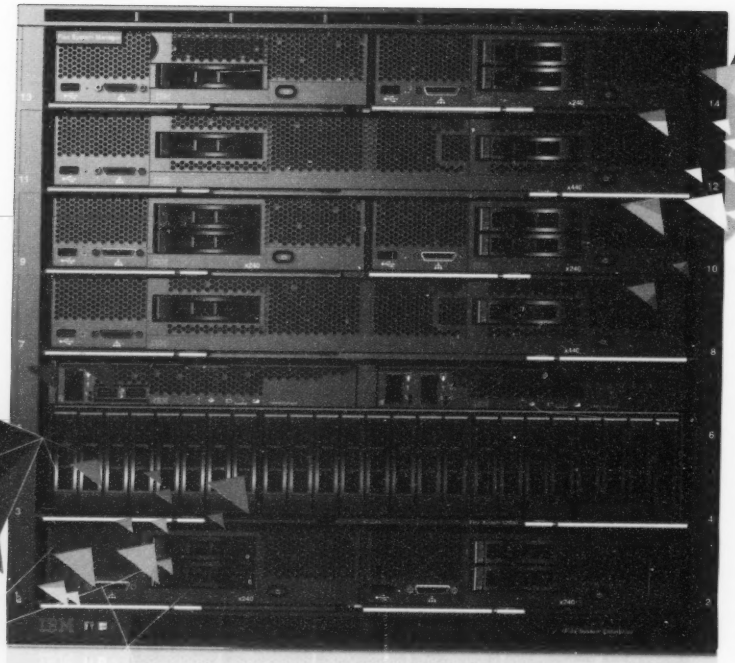
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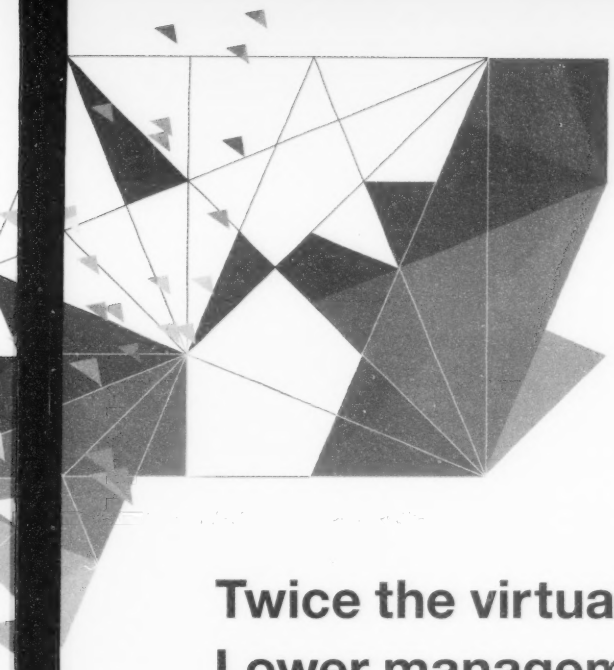

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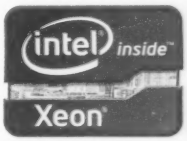

[1] Based on IBM testing and documented in IBM System x® Virtualization Server Consolidation sizing methodology. IBM Flex System x240 supports 2.7X more Peak Utilization Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

[2] Based on IDC white paper "The Economics of Virtualization: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, http://www.vmware.com/files/pdf/Virtualization-application-based-cost-model-WP-EN.pdf

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OPERATING SYSTEMS

Some Say XP's Retirement Is in Doubt

SOME SECURITY researchers wonder if Microsoft will indeed retire Windows XP on April 8, 2014, as the vendor has announced.

After that date, Microsoft will no longer distribute official security updates or bug fixes for the ancient operating system — though it will offer them to enterprises that pay for high-priced support contracts.

PCs still running XP won't just suddenly stop working, of course, but they will be vulnerable to attacks exploiting weaknesses in the operating system that are discovered after that date.

Some observers believe that leaving PCs running the still widely used operating system could lead to trouble. Michael Cherry, an analyst at Directions on Microsoft, conjured up this scenario: What happens if "a security problem with XP suddenly causes massive problems on the Internet, such as a massive [denial-of-service] problem?" That could become a worldwide tech crisis, and "in this scenario," he said, "I believe Microsoft would have to do the right thing and issue a fix."

Others disagree. "I think they have to draw a line in the sand," said Gartner analyst John Pescatore. "They've supported XP longer than anything else, so they'd be pretty clean from the moral end."

Pescatore said the only scenario he could envision in which Microsoft extended XP's life would involve business considerations, not security concerns: The company might continue to support XP as a way of holding on to customers still using the operating system rather than risk losing more market share.

– Gregg Keizer

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FLASH STORAGE

EMC's Project X: Flash Storage For Data Centers

EMC is developing flash storage for use throughout data centers, and it's working on software to tie all enterprise flash components together.

The company is using technology it gained through its May acquisition of XtremIO to build an all-flash array code-named Project X, which is due to hit the market next year. The platform will also introduce software that EMC plans to use with flash products in other environments, including on servers and within server networks.

Project X provides an opportunity to design a storage architecture based on flash from the start, without constraints inherited from hard disks and other older technologies, said Zahid Hussain, general manager of EMC's flash products division.

Now in beta testing, Project X will be built with x86 processors and standard solid-state disks, along with standard network interfaces such as Ethernet and Fibre Channel.

But the core of the offering is software that can be applied to other flash storage elements in an enterprise. It "takes full advantage of multicore, understands the characteristics of flash, and is designed to be modular and scalable," Hussain explained.

EMC will continue to develop VCache, a server-based flash product, and Project Thunder flash appliances.

– STEPHEN LAWSON, IDG NEWS SERVICE

BETWEEN THE LINES
By John Klossner

IT INDUSTRY

HP Commits to Embattled Autonomy

HEWLETT-PACKARD CEO Meg Whitman has again affirmed the company's commitment to its embattled Autonomy software division, saying that HP's fiscal health is stronger than some may believe.

"There's been a lot of challenges, but a lot of victories," Whitman said in a keynote speech at the HP Discover conference in Frankfurt, Germany, this month. "I want to thank you for sticking with us through some difficult times."

Whitman was alluding, in part, to HP's recent announcement that it will take an $8.8 billion fourth-quarter write-down — around $5 billion of which it attributed to alleged accounting improprieties by Autonomy before HP acquired the company for $10.3 billion in a widely criticized deal last year.

Autonomy founder Mike Lynch maintains that neither he nor any other Autonomy executive engaged in any wrongdoing. He also questions how auditors could have missed improprieties amounting to $5 billion during the vetting process before the deal closed.

Despite the back-and-forth between HP and Lynch (who set up a website — Autonomy-Accounts.org — for his responses to HP), Whitman said, Autonomy "will play a very significant role in our growth strategy. We remain 100% committed to Autonomy's industry-leading technologies and its employees."

Autonomy, which sells information management and search software, hasn't performed as well as HP had hoped. And Whitman, who took over as CEO last year following the ouster of Leo Apotheker, is also grappling with a weakened stock price and declining server and services sales. The company is trying to regain its footing with a three-pronged strategy involving cloud computing, information management and security.

Nonetheless, Whitman contends that HP is "quite profitable" and is still "the No. 1 or No. 2 provider in virtually every market in which we compete."

– Chris Kanaracus, IDG News Service

Micro Burst

Healthcare provider Kaiser Permanente is hiring

500

IT pros to staff a new technology campus near Denver.

SOURCE: KAISER PERMANENTE

CLOUD COMPUTING

AMD Eyes Server Revival With Bold New Approach

To break its slump in the server market, Advanced Micro Devices has adopted an aggressive strategy whose goals include the introduction of new ARM and x86 chips by 2014 and continued improvements to its Opteron chips.

The company recently introduced two low-power Opteron processors that are designed for use in cloud servers that process Web transactions. Meant for entry-level and midrange servers, the nine new Opteron 4300 and 3300 x86 server chips can have up to eight cores.

The new chips could be used in AMD's SeaMicro line of dense servers, which now use the Opteron 4200 and 3200 chips introduced late last year. The new chips offer an average performance boost of 15% and consume less power.

AMD's goal is to mix and match x86 and ARM processors in servers. Last month, AMD started shipping Opteron 6300 chips for midrange and high-end servers.

AMD had a 4.5% share of the x86 server processor market in this year's third quarter, down from 5.2% in the same quarter last year, according to Mercury Research. The remaining market share belongs to Intel.

– AGAM SHAH, IDG NEWS SERVICE

If Tech Is Key, Why Are IT Wages Flat?

Unemployment for IT professionals is well below national rates, but IT salaries have barely moved in 10 years. By Patrick Thibodeau

DESPITE THE fact that technology is playing an increasingly important role in the U.S. economy, IT wages remain persistently flat.

"IT salaries have not really kept pace with inflation," said Victor Janulaitis, CEO of Janco Associates, which follows IT compensation trends.

The still-sluggish U.S. economy gets most of the blame, but outsourcing, improved productivity and automation are also factors, say analysts.

According to a new report compiled by the Economic Policy Institute (EPI), a policy research firm, the average hourly wage adjusted for inflation in computer and math occupations that require at least a bachelor's degree was $37.27 in 2000; the average hourly wages for those same jobs had increased by less than $2 an hour in 2011, to $39.24.

The results translate to an average wage increase of less than 0.5% a year, or just $1.97 an hour, over 10 years, according to the EPI report.

The report is based on data from the Current Population Survey, a monthly survey of households conducted by the Census Bureau.

A running index of hourly technology wages compiled by Yoh Services, a staffing firm for skilled IT pros, lists an average hourly wage of $31.45 for week 12 of 2012; Yoh listed the hourly average as $31.78 for the same week in 2010.

Over the past 10 years, Yoh's index has shown hourly wages consistently in the $30 to $32 range, for the most part.

John Longwell, vice president of research at Computer Economics, said that while "it would be fair to say that the globalization of markets for goods and services is helping restrain wages across many sectors, including the IT sector," observers shouldn't overstate the impact of IT offshoring.

"Offshoring is certainly having an impact on programmers," but other factors like low inflation, sluggish economic growth and improved productivity are more "important factors in restraining U.S. wages in general, including IT wages," Longwell said.

Joel Capperella, vice president of marketing at Yoh, said wages generally go up when companies expand use of temporary IT workers, as is occurring today, "because historically, temporary demand increases have preceded an increase in permanent employee demand." However, he noted that this recovery period has been so sluggish that an increase in permanent IT jobs doesn't seem imminent.

Capperella did note that wages are rising faster for people whose skills are in demand.

For instance, the supply of IT pros with expertise in agile development is very low, while demand for such skills is strong, Capperella noted. Those skills, therefore, "command a very high hourly and salary rate," he added.

The EPI report was written as a counterpoint to Microsoft's proposal to let companies pay the federal government for H-1B visas so they can hire foreign workers who hold degrees in the so-called STEM fields (science, technology, engineering and math) for jobs that are unfilled due to an IT skills shortage.

Contrary to Microsoft's claim, "there are too many educated, experienced STEM workers who are trying to find a job; there is not a shortage of them," said the report's author, Daniel Costa, an EPI attorney and immigration policy analyst.

Microsoft's proposal is "unsurprising," Costa said, since adding STEM workers in a tough economy would boost IT unemployment rates, which in turn would keep wages low. ◆

> "IT salaries have **not really kept pace** with inflation."
>
> VICTOR JANULAITIS
> CEO, JANCO ASSOCIATES

STEVE TRAYNOR

Microsoft Squeezes IT With CAL Price Hike

Struggling in the mobile market, the vendor still hopes to cash in on the BYOD trend with a 15% increase in the price of user client-access licenses, say analysts. **By Gregg Keizer**

THIS MONTH'S PRICE INCREASE for Microsoft client-access licenses (CAL) is a "lose-lose" deal for enterprise customers, but will likely yield a major revenue boost for Microsoft, analysts say.

On Dec. 1, Microsoft overhauled its enterprise license pricing, most notably raising the price of "user" CALs by 15%.

CALs are required for corporate workers to legally access Microsoft software running on application servers.

Microsoft previously priced its two categories of CALs — "device" and "user" — identically. Device CALs are tied to a specific device, typically a desktop or laptop PC. The user CALs allow an enterprise worker to access applications on servers from multiple devices, such as PCs, tablets or smartphones.

"Microsoft is looking for new revenue," said Daryl Ullman, managing director of Emerset Consulting Group. "Changing licensing is always a way vendors deal with a revenue problem."

Ullman and other experts see the user CAL price hike as a bid by Microsoft to cash in on the burgeoning bring-your-own-device (BYOD) movement, where people use three or four personal and/or company-owned devices on the job.

It's no coincidence that the increased revenue will come mostly from mobile devices, experts said.

Today, Microsoft has virtually no mobile presence. So it's looking to make a quick buck by sponging off the popularity of mobile devices running other vendors' operating systems, Ullman said.

Jeff Muscarella, a partner with Atlanta-based consultancy NPI, wouldn't speculate on how the price increase will affect Microsoft's coffers. But in a report to clients, NPI said that the move "could mean billions" for the vendor.

He said the CAL hike is relatively small, but Microsoft's licensing schemes remain complicated, which hurts users.

"Whenever licensing is complicated, it benefits the vendor," he said. "A CFO once told me, 'Mystery equals margin.' That's true with Microsoft."

Thus, he called the CAL price increase a "lose-lose" proposition for Microsoft's enterprise customers.

Paul DeGroot, an analyst at Pica Communications, described paying the 15% increase as the "lesser of two evils."

DeGroot said many companies don't realize they are obligated to buy client-access licenses for devices, so if Microsoft were to audit their licenses and find there aren't enough, it could drop the hammer.

"It could get nasty," DeGroot said. "All those sent emails with the helpful signature 'Sent from my iPad,' for example, are tip-offs to underlicensing."

Even with the price hike, though, DeGroot said he will continue to recommend that clients buy user CALs, reasoning that as mobile devices proliferate, they're still the better deal.

Some also see Microsoft's new emphasis on user CALs to be part of a larger strategy to shift customers to subscription-based licensing. "They've thought this out," said Ullman. "They are using the licensing push to get customers to join their cloud wagon, and once you're hooked, they'll want to move you to subscription-based licensing."

Although the price increase went into effect Dec. 1, users will pay already-negotiated fees until their current contracts end. ◆

> "All those sent emails with the helpful signature **'Sent from my iPad,'** for example, are tip-offs to underlicensing." — PAUL DEGROOT, ANALYST, PICA COMMUNICATIONS

THINKSTOCK

PHOTOS COURTESY OF JAMES T. WILKES

THE Grill

James T. Wilkes

Teacher, farmer, beekeeper and technologist – this IT professor combines his life's pursuits.

Family: Married, with eight children ranging in age from 4 months to 21 years old.

Do you have a goal you'd still like to achieve? I have this crazy notion of creating one business per child. They're kind of on their way. They each have a little niche they're developing. I want them to be productive and support themselves and their families in a nontraditional way.

Is there something that not many people know about you? I love to surf.

AS CHAIR *of the Appalachian State University computer science department, James T. Wilkes is helping prepare the next generation of IT professionals. But even though he holds a Ph.D. in computer science from Duke University, he's no ivory tower intellectual. Wilkes understands how computing can impact even earthy pursuits, including his other two professions: farming and beekeeping. Here he shares his insights on education and IT applications and discusses how these disciplines mix.*

You originally wanted to teach math. How did you get into computer science? I wanted to teach math, but I didn't like the teaching classes. And there was a speech class I had to take, and I hated speaking in front of people, so I changed my major. I took all the math and science and physics and computer science classes I could fit into my schedule. I came in when PCs were being born, and I was just intrigued by the computing and programming side. I enjoyed that puzzle-solving piece, and that allowed me to continue to do the math things that I enjoyed. I also recognized early on that there were more opportunities in

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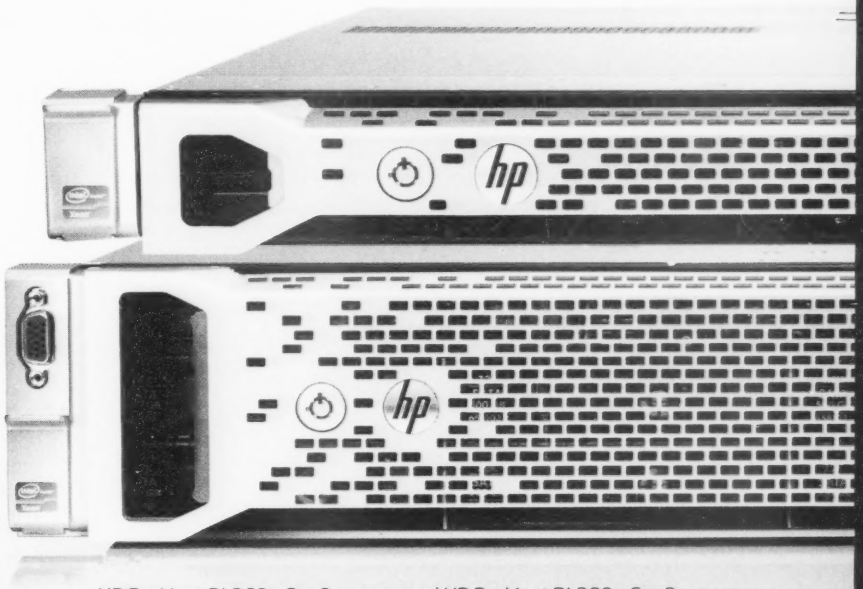

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> **What I've learned is that it makes a lot of sense** to marry something you're passionate about with technology. I tell that to my students.

computer science than in math in terms of both job opportunities and breaking new ground.

There are concerns that not enough U.S. students are studying computer science. Is that true, and if so, why? Part of [the problem of attracting students] is that students don't know what computer science is, so there's an awareness problem, and once you get into it, it's difficult. It takes a lot of time, effort and perseverance. You have to think creatively. All those things combined make it a challenging discipline.

But I've really seen a transformation. In 2006, we bottomed out. There was a worldwide decline in computer science enrollment after the dot-com bust, and I think that was a perception problem. People thought the jobs all got offshored, but I've seen a resurgence in not only jobs but also in enrollment. Our enrollment is up 20% this year over last year, and last year was up 20% over the year before.

Does that increasing enrollment match employer demand for people with IT degrees? All the projections are that demand [for IT professionals] is outstripping the number going in. I see that from the employers knocking on our doors. There's definitely more room for more people to get into it.

What's most challenging about teaching IT to today's students? [Helping them] apply what they're learning. I preach this constantly: We'll give you the coursework, the skills, the knowledge in this domain, but at the end of the day you have to be able to do something with your knowledge. You have to be able to talk about what you can do. We really push experience outside the classroom and provide opportunities to do that. Internships are pretty popular in computer science, and we have opportunities within the department where students can be involved in research with faculty or in a program where they form research clubs to work on some interesting problems.

Do you use computer technology to help you run your farm? I'm always thinking about how technology can help me. And the result has been one of my other endeavors: Hive Tracks beekeeping records management software. That was born out of being in my yard, doing what beekeepers do and thinking about what technology could do.

This is the technology you developed to research issues around beekeeping? I've got this Web application called Hive Tracks, which is a tool for beekeepers to keep records of what they do with their hives, a best practice of what they should be doing. A friend of mine and I developed that. We have over 6,000 registered users in 50-plus countries; most of our users are in the Southeast U.S. It's free for now, but we're working on how to monetize it. It came out of my need to want to walk up to my hive and have my device know what hive I'm at, what's been done there, what needs to be done.

And then another piece of that is having an instrumented hive, which actually feeds live data back to the application. The sensors there would [measure] weight, humidity, activity inside the hive. And this is creating a rich data set that I believe we can leverage to figure out some things going on with bees, what are the best practices for keeping bees alive, maximizing honey production, how to be more efficient. It will provide us with a way to learn more about bees and can reveal some interesting things about bees we might not have known before.

[With this,] I've able to marry the beekeeping to the academic world through an FDA grant, the Bee Informed Partnership. Appalachian's piece of that grant is the computing side, building the tools for gathering, entering, storing, analyzing, displaying the data. Data is sort of the new capital.

What can CIOs and other IT executives learn from your experience in that area? What I've learned is that it makes a lot of sense to marry something you're passionate about with technology. I tell that to my students. If you've got this underlying understanding of technology, you can marry it up to this area you're passionate about, and you'll be a much more effective contributor. If I'm a CIO and I'm looking to hire, talent and technical background is one piece, but someone who is passionate about what I'm doing is maybe more important, or at least as important.

— Interview by Computerworld *contributing writer* **Mary K. Pratt** *(marykpratt@verizon.net)*

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THE NEW ECONOMY PUTS YOU IN THE DRIVER'S SEAT OF YOUR CAREER.
Can you handle it? We'll show you how.
BY JULIA KING

YOUR CAREER, YOUR CALL

THE DAYS of building a lifelong IT career at a single company are long gone. And now, the days of building a lifelong IT career just within the IT department are dwindling, too.

Technology professionals today are just as often advancing their careers through a marketing group or supply chain organization as they are through an application development team or software quality group. Tech staffers are migrating into new roles — frequently with non-IT job titles — throughout the enterprise, working on an array of projects that require tech savvy in addition to business and process knowledge, management skills and more.

To move ahead in 2013, you'll first need to drop any lingering notions of vertical ladder-climbing. After that, it's all about exiting your comfort zone and actively seeking out new and different opportunities, rather than relying on traditional organizational charts, human resources or even your own immediate manager. Your very best career strategy, experts say, is to take over the navigation controls yourself. Your very career and livelihood depend on the out-of-the-box thinking that goes into formulating and then executing such a strategy.

There's no doubt the process of career strategizing can be daunting, but it can also be empowering because your strategy will be based on your individual passions and skills as well as your career goals.

We asked veteran IT professionals to share their best advice for mapping and continually updating a personalized guide to your career future. You can start by deleting your old plans, because 2013 marks the start of a radically different IT career landscape.

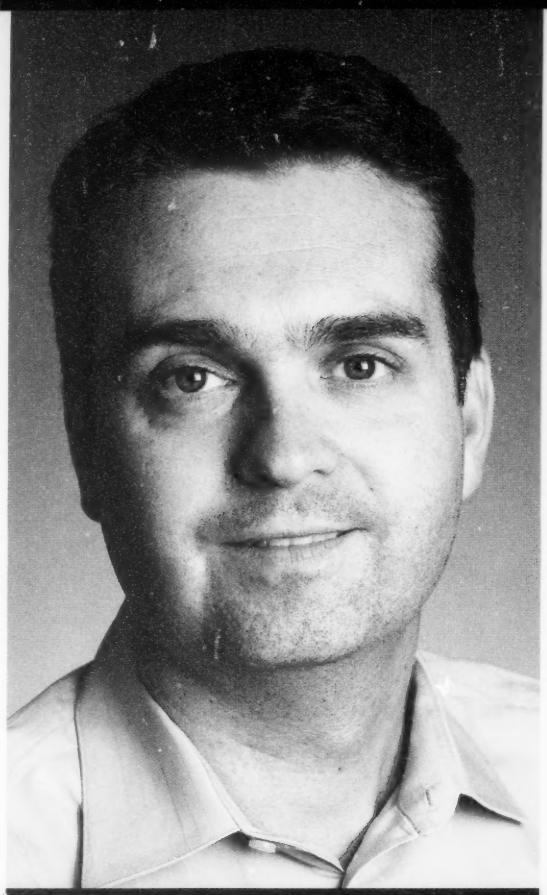
Do Your Research

Not all career strategies must be drawn entirely from scratch. Check first to see what kind of career tools or development programs your potential or current employer may have on the books. "Find out if they're going to invest in your career and ask about movement of IT people into different roles," advises Andrew Macaulay, senior vice president of IT at Bellevue, Wash.-based Clearwire, which builds and operates mobile broadband networks. While most IT professionals are indeed on their own, an increasing number of companies have or are developing detailed plans for rotating and advancing employees through different roles.

"We have specific job descriptions that help employees see what they need to do to get to where they want to go," Macaulay says. "People are laying out their careers three years at a time and creating their individual development goals to get there."

At BNSF Railway in Fort Worth, Texas, recent college graduates are recruited into a management training program, which includes rotating through various assignments across the freight transportation company. "We spend time educating people in what BNSF is about and how we operate," says CIO Jo-ann Olsovsky. "It's not something you learn overnight. We're trying to accelerate the learning curve."

Olsovsky says teaching participants about BNSF's culture is one of the key goals. "While going through all of their assignments, people learn that BNSF is an operations-oriented company. That's the culture. We move freight," she says. "In an operations culture, what gets rewarded are those things that deal with operations, like dealing with a crisis," she says. As an IT professional, "you have to figure out a company's culture and decide if it's for you," she adds. "It's a way to shortcut your way to rewards. One area where I see people miss steps is not understanding the culture of the company they're in."



Andrew Macaulay, senior vice president of IT at Clearwire

Time Your Moves

Jim Clementson, director of technology at Providence Health, likens the points on a career plan to steppingstones across a stream. Their ultimate purpose is to help you get to the other side, but it's best to take them one at a time.

"You can't think too far out. It's more important to be flexible enough in the three-to-five-year time frame," he advises. "Don't

> **YOU CAN'T THINK TOO FAR OUT.** *It's more important to be flexible enough in the three-to-five-year time frame. Don't say, '20 years from now, I want to be a CIO,' because then, that's all you're looking for.*
>
> **JIM CLEMENTSON,** DIRECTOR OF TECHNOLOGY, PROVIDENCE HEALTH

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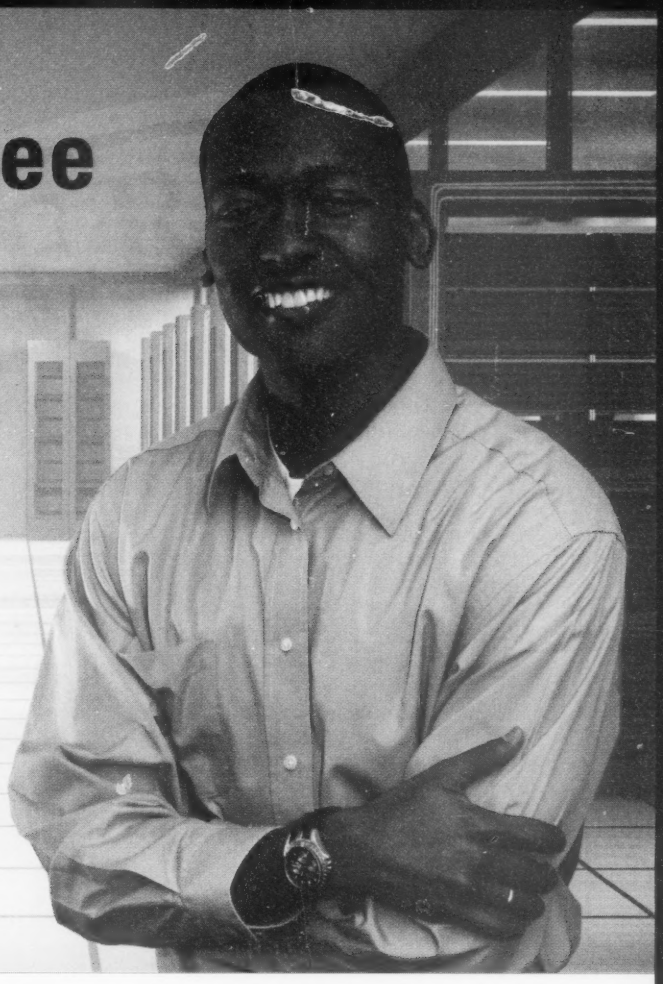

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say, '20 years from now, I want to be a CIO,' because then, that's all you're looking for." It's more important to be open to a wide range of roles that could broaden your knowledge and help you acquire experience that will serve you well over the long term, he says.

In his own career, Clementson moved from a software developer role at Arco Alaska to the company's service center, which in turn "opened doors into the infrastructure realm," he says. He ended up leading a Mac-to-PC migration project. After that, he went back to software development for a while, and then moved into the healthcare industry. There, his experience with the Arco migration project helped him land a leadership role on an electronic medical record project, and that led to his current role as director of delivery for infrastructure.

"It's all about looking at what's available and adjusting things and stretching yourself," he says. "You have to be comfortable and willing to move into the opportunities that are out there."

Olsovsky says 18 months to two years is a good benchmark. By then, you understand the role and it's time to make the next move, she says.

"But you have to be thoughtful about your progression," she warns. "If you're an applications developer in marketing systems and you know marketing systems, that's great. But if the boss has an opening in operations systems, that's a better choice because [you'll] get an operations background, which will make you even more valuable for the next progression. You have to keep your eyes open for side-to-side moves that move you ahead."

Rotation, Rotation, Rotation

The most effective career strategy is more directional than specific. That is, it may point to an ultimate dream position, such as a directorship or executive management role, but it should also take into account the fact that, inevitably, there are multiple routes to the same destination.

"Statistically, if you look at CIOs, very few of them grow up in just the infrastructure area alone," says Cora Carmody, CIO at Jacobs Engineering Group, a $10 billion global construction and engineering services company. "We try to keep that in mind for people who are coming up in infrastructure. We want to get them cross-functional experience so they have more capability to take my job."

Early on in your career, it's all about acquiring multiple experiences, according to successful IT veterans.

"The first thing you have to do in your career is touch a lot of things. Check out a bunch of areas and see which ones spark your passion," says Jamie Hamilton, vice president of software engineering at Quicken Loans in Ann Arbor, Mich.

Quicken is a major online lender, and "the underlying thing that makes our whole business possible is technology," Hamilton notes. "We have a team of 200 software engineers who develop internal applications and other systems for the mortgage process, marketing and mobile apps. The tech team takes a lot of responsibility to move the company forward. IT drives the business." That means a lot of opportunities to move around and gain experience across multiple areas, says Hamilton, adding that "you should remain broad in experience at the beginning and don't jump into a specialization."

"Early in their careers, most people do not have an exact idea of what they want to do, mainly because they don't know what the possibilities are," says Macaulay. "You don't know what you don't know, but meanwhile, there are a number of paths."

At Clearwire, for example, IT pros can pursue a super-technical individual contributor role, go down a more traditional management track or gain experience in people management and/or project management. Macaulay says he advises employees to volunteer for assignments in all of those areas to get an idea of what they like. His message is, "Identify your passions."

Jacobs Engineering sets up an individual development plan with each IT employee to learn what skills staffers want to acquire and what their project interests and career goals are. The plan is used as a guide for career rotation roles and cross-functional assignments. "This is something we do, not just for college graduates, but for everybody," says Carmody.

Eye the Horizon

What do I need to know before it gets here? "That should be the question you're always trying to answer," says Scott Caldwell, technical services manager at Johnson County Transit in Kansas City, Mo. For example, with the explosion in the popularity of tablets and smartphones, getting up to speed on mobile technology and the way it could be used at your company or in your industry is critical, because it will very likely play a role in every enterprise someday soon, if it isn't already.

"You have to seek out information and make the extra effort to find what the trends are. You want to make sure you know where things are going so you can be there," Caldwell says. "That doesn't mean you have to be an expert in mobile operating systems, but you need to know what it is and its impact on the industry as a whole."

In the public transportation industry, for example, officials used to buy specialized equipment for buses, but eventually that equipment was no longer needed because it was replaced by tablets. "I can go out and buy a $300 tablet to replace a $15,000 piece of equipment we would have bought five years ago," he notes.

To keep informed, Caldwell reads industry publications and websites, attends

MAP IT

LAUNCHING A JOB SEARCH?

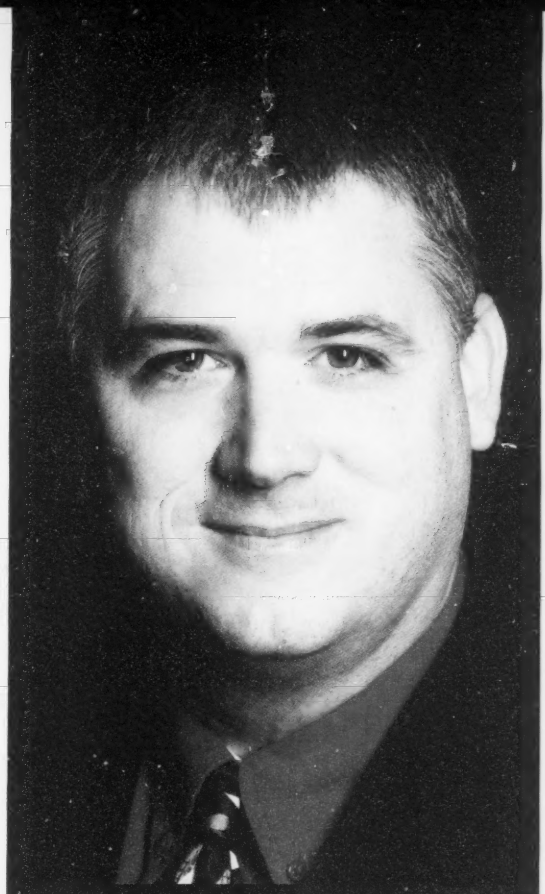
A good starting point is to draw a career map, which at its simplest is an inventory of your skills, experience and goals. But it should also include much more.

"It's an analysis of your competencies and past work experience, plus a forward look at possibilities," says Ginny Clarke, president and CEO of Talent Optimization Partners in Chicago and author of *Career Mapping: Charting Your Course in the New World of Work.*

Ginny Clarke

A career map also includes an outline of how to achieve one or more of the objectives you have. This could be a list of roles to move into or projects to get involved with as a means of gaining experience and new skills. "It's like a financial plan in which you look at how much money you have, how much you want and how you intend to get there," Clarke says.

– JULIA KING



Scott Caldwell, technical services manager, Johnson County Transit

conferences, networks with friends and colleagues, and participates in gatherings of IT trade and professional groups. "Being more aware and seeking to know where the market is and what companies are doing and what the trends are in the industry all drives back to help a person take charge of their own career," he says. "If you know what's happening today and know what will happen in the future, you can start planning out what training you'll need."

At Jacobs Engineering, IT staffers can join in regular monthly project reviews that are conducted on all active programs. "We talk about risks, requirements [and] stakeholders, and we opened up these project reviews to anybody in IT who wants to learn about that project," Carmody says. IT pros everywhere should look around their own organizations for similar opportunities.

One of the hallmarks of the organizations that *Computerworld* recognizes as Best Places to Work in IT, like Jacobs Engineering and BNSF Railway, is that they offer IT workers a variety of opportunities to broaden and deepen their skills through training programs, tuition reimbursement plans and mentoring arrangements. But such initiatives might be the exception rather than the rule; many IT employees say they are on their own when it comes to training to acquire new skills.

Manage Your Skills Portfolio

It's no secret that most corporate training budgets have been declining in recent years. But at the same time, technology is changing more rapidly than ever before. "It's just understood that every year you have to take up a new skill," says Johnson County Transit's Caldwell. "You never stop learning until you're dead."

Caldwell has paid for most of his own training, which includes multiple certifications. "The training money just isn't there with companies. It's really up to the individual to decide what they want to do with their career and how to drive it. You can't expect the organization to provide that career training," he says. To fill that gap, he has bought books, taken online training courses and networked with colleagues to learn new skills.

Another option is to find a mentor.

"Everyone seems to underestimate the need for a coach and mentor. You need one, both internally and externally," says Hamilton of Quicken Loans. "If I had to do it over, I would focus on that a lot more."

At Jacobs Engineering, Carmody launched a mentoring program that's open to all IT employees. Staffers can find senior colleagues to team up with at an online mentor-matching site. The initiative includes an educational program called Leadership in Work and Life that features monthly teleconference workshops on topics such as how to protect the Jacobs brand, deploying capital wisely, agile software development and the scrum method, and voice-over-IP technology.

"I believe career development for anyone is a mix of classroom, mentorship, ad hoc cross-functional opportunities and volunteering," says Carmody. Even when the workshops are on nontechnical topics, she encourages her staff to participate.

"I tell people that it doesn't matter how technical you are; you deal with people so your people skills will always need maintenance. And you're supporting a business, so you [must continually] learn about the business," she says. "If you're a technologist, you still need to know the business and communicate effectively." ◆

> **I TELL PEOPLE THAT IT DOESN'T MATTER HOW TECHNICAL YOU ARE;** *you deal with people so your people skills will always need maintenance. And you're supporting a business, so you [must continually] learn about the business.* – **CORA CARMODY,** CIO, JACOBS ENGINEERING GROUP

OPINION

THORNTON A. MAY

Why the Word *Career* Has Become Obsolete

> We live in an age when the most important skill is the ability to acquire new skills.

LIKE TECHNOLOGIES, some words have life spans. They are born, enter the mainstream and then fade into obsolescence. Research from the Olin Innovation Lab and AIIM Executive Leadership Summit posits that the word *career* is due for a major rethink.

The iconic "gold watch" career path, in which people stay with the same employer for their entire working lives, has become anachronistic.

In the Middle Ages, one never heard the word *career*. Clerics in their monasteries (the first estate), kings in their courts (the second estate), and commoners in their mud huts (the third estate) didn't discuss career options.

For the 700 years that followed, the annual per capita GDP for the place that would come to be known as Europe would stagnate between $400 and $550 (expressed in constant 1990 U.S. dollars). Your best bet was to pursue a career as king.

In much of early modern Europe, for most of recorded time, what one did occupationally (i.e., one's career) was essentially determined by birth. There was very little choice involved.

The modern concept of a career originated in the mid to late 19th century. The advent of the word *career* precisely coincides with the expansion of occupational choices. With improved agricultural methods, more food could be produced by fewer people, thereby allowing some subset of the people laboring in the fields to pursue other forms of employment. Technological innovations (like the steam engine) enabled new modes of production (e.g., factories) that expanded the work choices available.

In the Golden Age of Careers (1815-1968), executives believed they knew what needed to be known. Industrialists like Henry Ford instituted the scientific management principles of Frederick Taylor, mandating enforced standardization of methods and enforced adoption of the best implements and working conditions with an eye toward achieving the "one, best way of doing things."

The end result of this top-down "we know what we've got to know" conceit was, in just about every discipline and in almost every company that ever existed, a well-defined career path featuring a sequence of training, education and advancement via which an apprentice migrated to master (in the crafts and the arts) or a management trainee climbed the corporate ladder, perhaps reaching the CEO's office. Sizable vocational guidance, career development and skills acquisition industries grew up to help people understand the "rules of the game" and equip themselves accordingly.

That was then. But what does *career* mean in a world where the people at the top don't know what must be known? What does *career* mean when the rules of the game change daily?

The path to mastery can't take an entire career. IT workers have to "jack in" to hot skill sets. Many students no longer think in terms of "careers" or even "jobs" — they think in terms of "gigs." At a high-prestige university, I recently witnessed a graduate student quite far along in his course of study corner a founding partner of a revered venture capital firm that is heavily invested in big data. He asked, "What does this mean for me? What should I be studying?"

We live in an age when the most important skill is the ability to acquire new skills. Human "upgrades" are well represented in the science fiction community. Your career success is a function of how successfully you keep yourself upgraded. ◆

Thornton A. May is author of *The New Know: Innovation Powered by Analytics* and executive director of the IT Leadership Academy at Florida State College in Jacksonville. You can contact him at thorntonamay@aol.com or follow him on Twitter (@deanitla).

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POUNDING THE PAVEMENT

FOUR IT WORKERS WHO RECENTLY FOUND NEW JOBS DESCRIBE THEIR HARD-WON SUCCESS *and offer a view from the street.* BY MARY K. PRATT

IT'S NO SECRET to most technology professionals that the IT job market has outperformed other fields in the past few years, with unemployment rates much lower than the national average.

Yet IT hiring trends are subject to ups and downs, as is the case in any other field. So landing a new job is never a sure thing, with timing, geographic location and professional connections still influencing how smoothly and quickly the process proceeds.

Moreover, companies aren't necessarily quick to expand their staffs, even in growth areas like IT. Several labor market analysts reported that IT hiring fell in September, while others have predicted only limited growth in the fourth quarter. According to staffing firm Robert Half Technology, only 9% of the 1,400 U.S. CIOs surveyed for its IT Hiring Index and Skills Report expect to expand their IT departments, while 6% anticipate cutbacks.

Still, there are jobs to be had. Here are four IT professionals who recently landed new gigs and have tips on how to make it happen.

VICTO NGAI ILLUSTRATION

Derailed Near Retirement, Now Back on Track

TOM KIRKHAM

- **New job:** *Senior project manager, Maximus*
- **Search:** *One of the first emails he sent to former colleagues on the day he was laid off eventually led to his current job.*
- **Compromise:** *More travel*
- **Surprise:** *How many opportunities there are in IT given the overall high unemployment numbers.*
- **Advice:** *Prepare a skills-based résumé (rather than a chronological one).*

AS A FOUR-DECADE VETERAN of the IT profession, Tom Kirkham has experienced his share of layoffs. But he was still surprised on June 20 when his bosses told him he was being let go from his position as a senior business analyst at TIAA-CREF after eight years on the job.

"We knew there would be layoffs, but I didn't expect it to be me," he says, adding that he had hoped to retire from the financial services firm in four years, when he turned 66.

Even though he was blindsided by the news, and therefore a bit unprepared to begin job hunting, Kirkham says he was quickly ready to move forward. He had learned from past experiences to keep his résumé up to date and save lists of professional contacts and companies he wanted to target on his home computer.

Kirkham also learned what worked and what didn't. "I've had very poor success going out to Monster and other résumé sites," he says. "So I'd collect the names of companies I was interested in, and I'd search the companies' websites for open positions and reformat my résumé to tailor it to [each] job description."

He sent emails to about 20 or so IT professionals in his network, and he used exercises in the popular job hunters' book *What Color is Your Parachute?* to help plan his career path, something he regularly did when moving between jobs in the past.

He acknowledged that job hunting can be disheartening.

"It's a depressing process. You send in all these résumés, you talk to recruiters and you go in for interviews and you hear nothing. It's really an exercise in keeping your spirits up and carrying on," he says, adding that he treats job hunting as a full-time occupation.

But as bleak as the outlook seemed to be, Kirkham had his limits. He was unwilling to relocate from North Carolina, because he and his wife, a nurse practitioner, liked the area and wanted to stay put.

Despite those geographic restrictions, Kirkham's approach to finding a new job quickly paid dividends. One of the colleagues he had emailed the day he was laid off replied within days, telling him about an open position. Kirkham sent in his résumé and soon landed a telephone interview.

Maximus, a Reston, Va.-based provider of government services, offered him a job early in the summer, one of two offers Kirkham got by tapping into professional connections.

"Certainly the personal contact helped, but having experience in IT and interviewing with managers who valued that experience helped a lot, too," he says. Kirkham started as a senior project manager at Maximus on Aug. 6.

A Renewed Focus Pays Dividends

DAVID A. BOVEE

- **New job:** *Implementation technician, customer systems delivery, Quest Diagnostics*
- **Search:** *Spent about six months looking.*
- **Compromise:** *Taking a job that was less challenging — and less likely to introduce him to new technology — than he had hoped.*
- **Surprise:** *The number of jobs for which he was disqualified because he didn't have government security clearance.*
- **Advice:** *Keep at it, and learn from your job search failures as well as successes.*

DAVID A. BOVEE had been a one-man IT shop for a small furniture-assembling company on and off for a decade, until late last year when the company lost a contract and was forced to cut its staff, leaving Bovee focused on the task of finding a new job.

Bovee, 42, had earned a bachelor's degree in political science in 2009, and says he liked his job at the furniture company because it gave him the chance to gain skills in various areas of IT. He had also spent some of his career doing freelance PC and IT work, but those experiences didn't impress bigger companies, which made getting a new job tougher.

He started by looking for jobs in entry-level computer support;

> *It's a depressing process. You send in all these résumés, you talk to recruiters and you go in for interviews and you hear nothing.* **IT'S REALLY AN EXERCISE IN KEEPING YOUR SPIRITS UP AND CARRYING ON.**
>
> **TOM KIRKHAM,** SENIOR PROJECT MANAGER, MAXIMUS

he says he figured that would be a reasonable goal, considering the fact that he had experience but hadn't earned any certifications and didn't hold a computer science degree. He was also looking at management positions, because he had some administrative experience.

But he had to limit his job search to local companies because he didn't have the resources to move.

Bovee conducted his search "almost completely online," relying on job boards and the websites of large local employers.

"In hindsight, it was a very passive approach," he says.

As a result, Bovee didn't get many bites during the first three months of his search. Moreover, a number of jobs were out of his reach because he didn't have the security clearance that many employers in the Baltimore-Washington area require.

But then last winter, he sought help reworking his résumé from an acquaintance who was a programmer.

"She showed me how to work an IT résumé versus a traditional business résumé," he says, adding that she also showed it to her colleagues to get their advice. "A better listing of skills is what they proposed. In my previous résumé, I was trying to summarize everything I did for various small companies, so there was a lot of stuff. They helped me get more focused on what I was looking for and what I could bring to IT."

"The coaching I got helped almost immediately," he reports. "I started getting a lot more callbacks."

In addition, Bovee refined his search. He decided to look for a job in computer support at a larger company where he'd have the opportunity to learn about enterprise-level IT architecture.

And he switched to job boards specializing in IT, which is where recruiter ICONMA, a Troy, Mich.-based consulting and staffing firm, spotted his résumé. This led to Bovee's current job as an implementation technician in customer systems delivery at Quest Diagnostics in Madison, N.J. He started in May.

"What I'm doing right now is pretty far from my ideal job," says Bovee, who wants to work in a server room. "But given the economy and given my lack of concrete credentials, I'm very happy where I landed. I know it's not the end of the job hunt for me, but it's a great place to take my next step from."

Time to Follow a Dream, and Still Pay the Bills

RODERICK FLORES

- **New job:** *CTO, Sikernes Risk Management, plus contract work*
- **Search:** *Spent five months looking.*
- **Compromise:** *Potentially lower pay, and he must devote more hours to his contract work than he would like.*
- **Surprise:** *The unprofessional way hiring managers behave in dealing with job seekers (skipping scheduled calls, for example).*
- **Advice:** *"I think the key thing given today's employer-driven job market is to set reasonable expectations and stick to them: Do not take a job that is below those expectations just because the market is tight."*

HEN RODERICK FLORES quit his job last December, he already had another position lined up. Still, he knew he was making a risky move because he was jumping from a position as an algorithm and product development manager at a software company, where he had worked for two years, into the CTO's job at a start-up company that he co-founded.

He and the five other co-founders came together late last year just as Flores was looking for a new job.

"I had been actively looking since July [2011] because I was concerned about long-term job security. Here in New Mexico, it's been slow for a number of years," says Flores, 43. "But there was nothing I found intriguing. I was being very selective."

He had some specific parameters during that initial job search: He was willing to relocate, but only to places he and his girlfriend liked (which eliminated a job in Houston, for example). He wanted challenging work, preferably in a team leader or project manager position. He also wanted ample vacation time. "I don't mind long stretches of long workweeks, as long as I get the free time at the end of a major release," he says.

Then, after several months without finding a job he liked, the chance to start a company "just fell into my lap."

Flores went to work full time for his company, Sikernes Risk Management, on Dec. 1, 2011. He committed six months to making it work while living off his savings. Although the company is growing and Flores continues to serve as its CTO, he's now looking for contract work to earn some money.

It's been tough, though.

"I've been looking for high-performance computing stuff, but that's really tight. They either want full-time employees or skill sets I don't have."

He's also looking at contract jobs for Java developers or team leaders, but those positions either don't pay enough, involve costly temporary relocations or require time commitments that are longer than Flores would like.

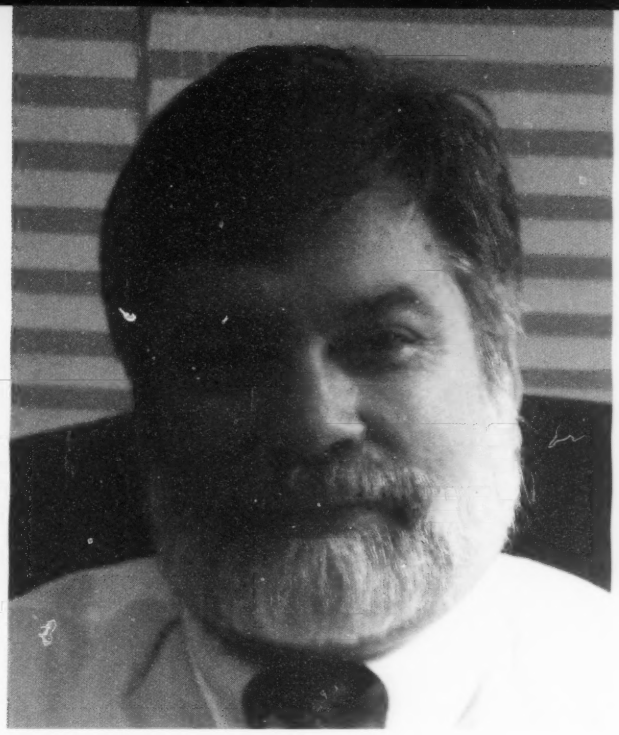
Meanwhile, Flores says he's finding a disconcerting attitude among hiring managers.

"Employers feel like they have the upper hand and they don't have to be courteous — no responses, missing interview times when they're set up. It's not very professional," Flores says, adding that he hadn't experienced that kind of behavior even during past recessions. "This is a new attitude," he says.

All this has made for a tumultuous couple of months, Flores says. He had a lead on a three-month contract, but that fell through. And his own company, which is developing quantitative cybersecurity software, is looking at a big contract with a national lab, but that potential client is waiting on federal funding.

So Flores decided to take a four-month part-time contract job doing Java development for a small company.

"I could easily get a nine-to-12-month contract from somewhere outside of New Mexico, but I'm having trouble finding something that lines up with the company I founded, which I really believe in," he says. "But the first compelling thing that comes my way, that will be the direction I'm going to tilt."



A Big Relocation Kicks Off a Brand-new Start

KEN LOBENSTEIN

- **New job:** *Information security director for governance and policy, Royal Philips Electronics*
- **Search:** *Had been looking for one day when he saw the posting for the job he ultimately took.*
- **Compromise:** *Delaying a move to Michigan to take a job in Massachusetts.*
- **Surprise:** *That his current employer had plans to hire four high-level IT security professionals at the same time during a slow economy.*
- **Advice:** *Know the importance of building and maintaining your professional network.*

EN LOBENSTEIN BELIEVES that a well-timed call to a colleague helped him land his latest job as information security director for governance and policy at the U.S. headquarters of Royal Philips Electronics in Andover, Mass.

Lobenstein, a 30-year veteran of the IT field, had been working as IT governance secretariat at the U.S. Department of Justice. He says he decided one day in April to look for a new job after "a very bad day at the office."

"I wasn't actively looking. It was just really a set of circumstances that made me go home and look for a job rather than staying in a situation with people who were change-averse," he says.

He saw an online job posting from Philips. He says he was attracted to the position for several reasons, including the fact that it might give him an opportunity to relocate to Pittsburgh, which would be closer to his daughter and her family in Michigan.

"I was just keeping an eye on the job market for future references. And because I had been in healthcare, I knew about Philips. I knew the quality of Philips as a company. It was a perfect storm of coincidences: my frustration, my connection, Pittsburgh being an option, and it being Philips," he says.

That night, Lobenstein sent out his résumé (which he keeps up to date but tweaked to highlight experience relevant to this particular job), then sent a note to a LinkedIn connection who was connected to a Philips recruiter.

"I spent time several years ago getting familiar with LinkedIn and building up my network as a result of a prior job search. So when I saw the Philips recruiter, I looked at my connections and I saw that my colleague had a connection. I don't know if that [helped me], but I'm pretty sure that relationship had something to do with it," Lobenstein says.

He adds, "The key, not for just me in this situation but in general, is the importance of building and maintaining a network and not being bashful about using it, because otherwise, you're just one résumé among hundreds."

Although Lobenstein pursued the job, the Philips position represented a significant shift in his future plans. He and his wife had been living in Virginia but had planned to move to Michigan within five years, so he had been building contacts there.

But he says the Philips position, which ended up being based in Massachusetts, provided such a great opportunity that he didn't want to pass it up. He says he was impressed by his boss and the information security division he was building at Philips.

"The professional excitement of it was overwhelming. So it was worth the family disruption to be here, and my wife agrees — she, in fact, pushed me into it," Lobenstein says, explaining that he and his wife bought a house in Michigan during the interview process. His wife lives there now, and the couple travel between the two states to visit each other. ◆

Pratt *is a* Computerworld *contributing writer in Waltham, Mass. Contact her at marykpratt@verizon.net.*

> *The key, not for just me in this situation but in general, is* **THE IMPORTANCE OF BUILDING AND MAINTAINING A NETWORK.**
>
> **KEN LOBENSTEIN,** INFORMATION SECURITY DIRECTOR FOR GOVERNANCE AND POLICY, ROYAL PHILIPS ELECTRONICS

SHOW ME YOUR SKILLS

Soft skills are key to career advancement, but they're difficult to quantify. **HERE'S HOW TO REVAMP YOUR RÉSUMÉ** *to make your talents shine.* **BY MARY K. PRATT**

ONE OF THE MOST DAUNTING TASKS in a job search is devising a résumé that's going to get you past that first cut. To do that, though, you have to know what the hiring manager really wants.

Sure, that's easy when it comes to the required technical skills: Degree in computer science. Five years' experience. Java expertise. Check. Check. Check.

But how do you recognize — and then convey on your résumé — the fact that you have, for example, team-building skills, the ability to work with minimal supervision, excellent analytical and problem-solving skills, and the ability to develop solutions using enterprise-level best practices? Those were actual requirements listed for a senior .Net engineer in a recent posting.

IT professionals often skim past lists of desired soft skills when they're reading help-wanted ads and don't bother to highlight them on their résumés, perhaps assuming they don't have them. That's a big mistake that can land your résumé in the wrong pile.

"I'm stunned at how otherwise qualified people disqualify themselves unintentionally," says Rick Endres, president of The Washington Network, an IT services company in Alexandria, Va.

Before you make that mistake, carefully consider your own experience, then think of all the skills that experience actually

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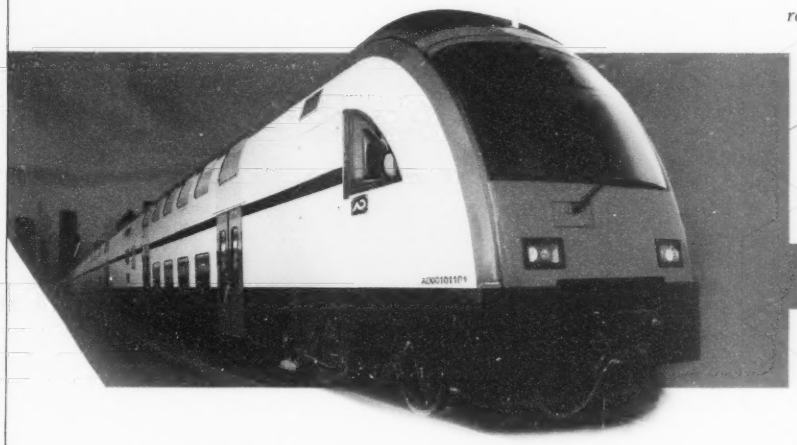

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showcases and highlight those skills on your résumé.

Here's a look at how you can do that with five sets of nontechnical skills culled from numerous job postings.

ABILITY TO TRANSLATE COMPLEX BUSINESS GOALS

The task of translating business goals might not be a big challenge for a business analyst, but how does a software developer or a database administrator demonstrate that he has such skills?

The best approach is to think of ways that your technical accomplishments contributed to your company's ability to reach its goals, says Michael P. Brooks Sr., regional account executive at Kforce Professional Staffing in Tampa, Fla., and president of the Boston chapter of the Society for Information Management.

Then spell that out on your résumé by using phrases like "contributed to such-and-such project, which improved customer service/saved money/generated new revenue," says Chad Lilly, director of recruiting at Lextech Global Services, a mobile application design, strategy and development firm in Lisle, Ill.

Some IT people "have a harder time doing that because they may only work on one component of a larger system, and that's one of the challenges that tech people face," says Lilly. "It's an unconscious thing, but you have to start to incorporate the understanding of why you're building what you're building."

SUPERIOR ANALYTICAL AND QUANTITATIVE SKILLS

Postings for business intelligence and analytics jobs naturally call for quantitative and analytic capabilities because those positions require mathematical expertise. But hiring managers may also list such skills in other IT job postings in hopes of finding good thinkers, says Rachel Russell, director at TEKsystems, an IT staffing firm in Hanover, Md.

They "want someone who can identify the root cause of issues and recommend solutions that apply to the business," Russell says.

How do you know you've got it?

Consider how you approach problem-solving, Russell says. Do you come up with multiple solutions and present them along with the pros and cons of each? When the business asks for help finding a solution, do you ask why they're asking so you can better understand the problem? When asked to pull data, do you learn why it's needed so you can present the data in a way that offers a holistic view of the information for the person who requested it?

If you answered yes to these questions, then you've got the mindset that hiring managers want.

To show that on your résumé, Russell recommends listing accomplishments that highlight your approach. "Describe how you used the skills [by mentioning] the projects you've supported and the impact you know you've had on the business," she says.

ABILITY TO INNOVATE, PASSION FOR PROBLEM-SOLVING

When it comes to recognizing and promoting their ability to innovate, IT workers often sell themselves short, says Amar Panchal, CEO of Akraya, an IT staffing firm in Sunnyvale, Calif.

"Writing code is creative. You can write code in five different ways. You can use the same language in five different ways to write a poem, but only when you use the words in the right way does the poem sound good. Writing a code in an optimum way is just like writing a good poem," he says.

Consider how you approached an assignment and whether your contribution made a difference. Have you written code that improved an application's performance or a business user's ability to do a task? If you have, "that shows creativity — that you see there's a better way to do something," Panchal says.

Also, list the ways you've been recognized for that kind of thinking, such as winning a corporate award. "If I see a résumé that says 'nominated' or 'won' these kinds of awards, it shows me that they're not just following instructions," Panchal says.

He says he also looks for IT people who have applied for or gotten a patent, published an article, written blogs or are contributors to user forums — all of which he considers proof points of an innovative professional.

EXCELLENT COMMUNICATION SKILLS

Although technical folks have a reputation for being introverted and prone to using techno-babble, you may have the communication skills hiring managers are seeking. In fact, many IT professionals have had to develop and employ communication skills as part of their everyday jobs. They just fail to recognize that and don't highlight it on their résumés.

"A lot of technical individuals have a tremendous amount of certifications. They showcase that they know how to perform those tasks, but they don't show how they're able to communicate with folks," says Mark Relf, a networking career program instructor at Computer Systems Institute (CSI), a post-secondary education provider in Illinois and Massachusetts.

Look at past jobs for proof: If you've worked on a help desk where you've coached users through troubleshooting exercises, recapped for your colleagues what you learned at a conference, written a request for proposals or briefed business partners on an IT project, then you have communication experience, says Robert Howden, also a networking career program instructor at CSI.

If that sounds like you, Relf recommends adding "communications" to your résumé and briefly detailing such experiences.

STRONG INTERPERSONAL SKILLS, PEER RELATIONSHIPS

When HR manager Fran Peters is trying to fill an IT position, she looks for the ability to work well with others in addition to strong technical skills.

Peters, who works at SWC Technology Partners, an IT solutions company in Oak Brook, Ill., says IT folks might hesitate to claim they have strong interpersonal skills because they don't have training in subjects like business communication, but there are several professional experiences that tell her a candidate does indeed possess such skills.

For one thing, she looks for people who have been members or leaders of teams, because successfully completing a project as part of a team is difficult unless you learn to work well with others. She also looks for IT pros with consulting experience, because that usually indicates that they've interacted with clients.

The bottom line, according to IT leaders and hiring managers, is that job seekers need to not only list what they *know* but also show what they can *do*.

IT workers likely gain more experience than they realize in the various projects they work on, and they can transfer that expertise from one job to another, experts say. But their résumés have to show hiring managers they've got what it takes. As Howden advises: Put your accomplishments front and center. ◆

Pratt *is a* Computerworld *contributing writer in Waltham, Mass. Contact her at marykpratt@verizon.net.*

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OPINION

PAUL GLEN

Build Relationships, and Opportunities Will Follow

> Career advantage comes from your ability to create good experiences for the people you work with.

YOUR FUTURE SUCCESS in the IT industry depends on embracing one simple, but hard-to-accept idea: There are no more jobs. I don't mean that there's no more work to do. Of course there is. Nor do I mean that you won't get hired to do things. Of course you will.

What I mean is that in nearly every way that counts, we are all contractors now. The only difference between being an employee and being a contractor is the benefits. The critical features that we think of as part of the employment relationship can't be relied on: security, career path, skill development and so on.

You don't need to fret about this. It's not necessarily a good or bad thing. It's just a fact of the labor market as it's evolved in much of the world. Employer incentives encourage labor mobility, so you need to account for it in planning for your career.

What that means for us in the IT profession is that even if you are an employee, you need to think like a contractor. Employees tend to think about the employment relationship as an exchange of skills, time and effort for salary and benefits. Of course, many contractors think about it the same way, but those are the less successful ones.

Successful contractors attract a constant flow of work because they create good experiences for their colleagues, users and customers. In the contract labor market, most work comes from referrals and invitations. As people move from gig to gig, they often bring in other people to help. And whom do they call? The people they know, trust and, most important, like working with. No one recommends someone who is a pain in the patooty, no matter how skilled he or she may be.

To recommend you, people need to feel that you will be sufficiently competent, invariably trustworthy, good to work with and, maybe most significantly, someone who will make them look good for recommending you.

And this helps determine the job opportunities that come your way. Your competitive advantage in the labor market will derive from your interest in, and aptitude for, creating good experiences for the people you work with. The higher you are on their list of people to recommend, the better you'll do. So the quality of the experience of working with you could play a bigger role in shaping their opinions than the quality of your work.

The good news is, you don't need to be an extrovert to put this approach into practice. You don't have to become some sort of glad-handing, back-slapping, joke-telling caricature of a salesperson. You just need to think about how other people feel and how they experience you and your work.

And above all, you need to be willing to create positive experiences for them. It's not hard. You just need to commit to doing what you promise, keeping them in the loop (especially if you can't keep your promises), really listening to them, knowing what's important to them, ensuring that they know that you know what's important to them, and responding to their sense of urgency.

Ultimately, your future security rests on your ability to embrace the idea that there is no security. In this new world, your relationship skills are as important as your technical ones. The more adept you are at thinking about the experiences of others, the more opportunities you'll have to tackle exciting technical problems and work in engaging roles. ◆

Paul Glen, CEO of Leading Geeks, is devoted to clarifying the murky world of human emotion for people who gravitate toward concrete thinking. His newest book is *8 Steps to Restoring Client Trust: A Professional's Guide to Managing Client Conflict*. You can contact him at info@leadinggeeks.com.

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Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:
Hardware Test Engineer (Austell, GA) **#1615.2157**; Design, develop, modify, and/or test hardware needed for various internet search engine company projects. Exp incl: diagnosis & troubleshoot of adv PC hw failure scenarios; boot process for purposes of hw failure analysis & troubleshoot; layer 2 (ethernet) & layer 3 (TCP/IP) ntwrk tech, incl diagnosis & troubleshoot of cable, nic, switch, & router failures, fiber & copper based ntwrks; TCP/IP, ethernet, & switched based ntwrks; Linux syst admin, incl monitor & analysis of hw logs; install, maint, & configure sw packages & svcs; ntwrk install over PXE & TFTP; load & unload kernel modules & log various module info; perf of low level hw diagnostics & root cause failure analysis; script lang; data analysis tools; tech doc for PC & ntwrkng hw; board design files (Allegro), elect schematics, & prod specs; & troubleshoot & analysis.

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Systems Administrator (Mountain View, CA) **#1615.559**; Develop, maintain and monitor Google infrastructure for internal applications. Exp incl: large Windows environ; sw for delivery via SCCM & SMS; Active Directory, WSUS, SQL, Group Policy, DNS, AV, & OS Deployment; VBS, Powershell, or T-SQL; & ntwrkng.
Business Systems Integrator (Mountain View, CA) **#1615.4862**; Design analytical solutions that provide data to answer complex business decisions. Exp incl: implement, configure, customize, & integrate 3rd-party sw solutions; dvlpmnt of bus appl end-to-end, incl front-end, data storage & appl integrate; Java; SQL & RDBMS; Unix or Linux; XML; supply chain, legal, finance, &/or HR bus domains; & info mgmnt, data model, syst integrate, dvlpmnt methodologies (incl unit test) & web tech.
Technical Solutions Engineer (Mountain View, CA) **#1615.3002**; Integrate Google products with customer technology. Exp incl: fight spam & abuse on web based svcs; Linux & Unix; TCP/IP; DNS; SMTP; MIME; Shell, Perl or Python; web related protocols & lang; & anti-virus tech.
Hardware Engineer (Mountain View, CA); **#1615.3387**; Design, develop, modify, and/or test hardware needed for building integrated circuits. Exp incl: design flow of analog & mixed signal integrated circuits; novel sigma-delta modulator arch; analog-to-digital converter circuit design; digital-to-analog converters; silicon characterization, test, & test flow dvlpmnt; model non-idealities in complex syst; & design at 90nm or finer process nodes.
Technical Program Manager (Mountain View, CA); **#1615.412**; Manage regional and global technology programs for Google. Exp incl: Java; JUnit test frmwrk; HTML, CSS, Jscript, Python & AppEngine; large-scale sw dvlpmnt improvemnt; process test on a non-user-facing infrastruct proj; improve site reliability on large-scale distrib syst; maint of code quality, scalability & readability in large codebases; coordinate large-scale tech prog; & commun of tech concepts to a non-tech audience.
Site Reliability Engineer Positions; (Mountain View, CA); Provide technical support necessary to ensure availability of Google online services. Exp incl:
#1615.512: C, C++, or Java; Python, Perl, Shell, or PHP; data struct; algorithms; complexity analysis; IP ntwrkng; & ntwrk analysis.
#1615.1242; Linux or Unix; & syst eng'g.
SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various Google projects. Exp. incl:
#1615.3543; Java & Jscript; MapReduce; version control tools; algorithms & data struct; HTML & CSS; SQL & Database; HTTP/RPC client-server protocols, & dvlpmnt of server client syst.
#1615.1552; write backend sw; distrib syst algorithms; distrib fault-tolerant designs; data struct, algorithms, & perf analysis of large scale distrib syst; debug large scale distrib syst; C++, Java, or Python; write codes; ntwrkng, incl TCP, UDP, IP, RTP or RTSP.
#1615.4176; data struct; algorithms; complexity analysis; analyze & troubleshoot large-scale distrib syst; IP ntwrkng; ntwrk analysis; ntwrk perf; Python; Shell; & C &/or C++.
#1615.3849; mach learn algorithms; graph models; distrib compute; linear algebra; parallel compute; probability; multi-thread program; C & C++; C++ templates; & C++ standard library.

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SW Eng Position (NY, NY): Design, develop, modify, and/or test sw needed for various Google projects. Exp. incl:
#1615.1176; C++ &/or Java; oo design; distrib syst sw design; sw dvlpmnt & design; Unix & Linux; data struct & algorithms; database design & SQL; & TCP/IP & ntwrk prog.
#1615.3826; large scale distrib syst; real time syst; UI; multi-thread prog; prog in Java, C#, or C++; bldng UI using HTML, CSS & Jscript; dvlpmnt of web svcs & appl srvrs using J2EE or .Net; srvc orient design arch using remote proced calls & lightweight msg formats; & release eng'g for prod syst deployment.

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Software Engineer Positions (Kirkland, WA): Design, develop, modify, and/or test sw needed for various Google projects. Exp. Incl.:

#1615.2061; compress algorithms; loadtime optimize; syst eng'g; & C++.
#1615.1845; oo prog in C & C++ &/or Java; bldng graphical UI to visualize data; dvlpmnt, test, & deploy features for web-based appl; databases; large-scale data analysis & infrastruct; data struct; algorithms; sw design; distrib syst; dvlpmnt of large sw syst; unit test; & Unix & Linux environ.
#1615.1044; Java; data analysis; oo tech; multi-thread prog; algorithm dvlpmnt & implement; & sw deployment.
#1615.717; C or C++; Java or C#; SQL; oo prog; multithread prog; design of large scale highly avail syst; real time transact; large scale distrib syst; & web svcs.

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SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various Google projects. Exp. incl:
#1615.426; algorithms; Java prog on Android pltfrm; oo prog; design & build of UI; data struct design; & MySQL.
#1615.4063; C++; Java; GWT; large-scale distrib prod syst; web dvlpmnt, incl HTML, CSS, & JS; non-relational databases, incl NoSQL, sharded relational databases, & ORM tech; large-scale distrib syst & svc-oriented arch; design & review of auditable syst process financial or privacy-sensitive data; mgmnt of the life cycle of sw syst, incl gathering of req, design, deployment & maint on prod infrastructure; & admin of prod syst, incl on-call rotation.
#1615.4106; C++; NoSQL databases; large-scale distrib & latency-sensitive servers; large-scale data index; parallel & distrib compute; load-balance & higher availability tech; & bug mgmnt and releases processes.
#1615.3861; GIS; geodata analysis; large-scale data process info extract; adv algorithms & geospatial related algorithms; Java; Jscript; XML; & HTML.
#1615.923; Java; Python; Linux or Unix; AJAX; design & implement large scale distrib sw syst; & appl of security & authentication protocols.
#1615.464; algorithms; mach learn; distrib syst; graph algorithms; Java; C++; & Python.
#1615.4458; large scale distrib syst design & implement; analysis & troubleshoot; real time data process; prod svc environ; large existing codebases; data mine & mach learn algorithms; data struct & algorithm design, complexity, & analysis; C, C++, & Java; participate on-call svc rotation; & coord team of eng.
#1615.3968; C &/or C++; multithread, STL, hashing, & dynamic prog; SQL; algorithm design & mach learn; sig process, large-scale data process & info extract; parallel & distrib compute; online & approximation algorithms; & large scale distrib syst.
#1615.3545; Java &/or C++; appl prog interface; & large distrib syst.
#1615.4863; Java, Jscript, C++, & Python; info retrieval & data mine; Java appl & design patterns; UI design & implement; web appl & multi-tier syst; Linux oper sys; Ntwrkng Protocol, incl HTTP & Stubby (RPC); data struct & algorithms; complexity analysis; large-scale distrib secure syst; & high-volume or critical prod svc environ.
#1615.1473; C++; Python; HTML; CSS; combinatory algorithms; adv data struct; dynamic prog; image process; & parallel prog.
#1615.3445; Java; desktop appl, server, & oo design & dvlpmnt; RDBMS; algorithms, complexity, & data struct; UI & front-end design & dvlpmnt; version control; scalable syst; Python, C, & Obj-C; web dvlpmnt; mobile dvlpmnt for Android & iOS; AI, search, & optimize algorithms; & proj mgmnt.
#1615.298; online payment space; large scale distrib compute & multi-thread syst; Java; MySQL; NoSQL type tech; API design & on-going support; payments process; web dvlpmnt; launch of prod svcs, & mobile dvlpmnt.
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Web Solutions Engineer (Mountain View, CA) **#1615.3572**: Design, develop, modify, and/or test software needed for various Google projects. Exp incl: multi-thread prog; distrib compute; web appl dvlpmnt; Java, Python, & Ajax; database mgmnt; Linux syst admin & shell script; API design; oo prog for backend; XML; & JSON.

Business Analyst, Consumer Operations (Mountain View, CA) **#1615.1026**: Define business intelligence (BI) technologies for Google. Exp incl: strategy dvlpmnt & implement; finan, strategic, & oper model; forecast & stata analytics; Excel, incl VBA prog & pivot tables; databases & SQL; Java, Jscript, & Linux shell script; large-scale data analysis & infrastruct; stats & analytics tools; proj mgmnt; & exec report.

Support Engineer (Mountain View, CA) **#1615.4244**: Design, develop, modify, and/or test software needed for various Google projects. Exp incl: prog or write code; proj mgmnt & data analysis.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various Google projects. Exp. incl:

#1615.700: Java; C++; Python; & comp graph frmwrks.

#1615.216: mach learn for image or text data analysis; image process; parallel & distrib compute; design algorithms for large-scale data process & perf analysis; & C++.

#1615.430: distrib syst; conversion of bus prob into algorithmic implement; data struct; large scale stor syst; Java; C++; Python; & Linux

#1615.3614: Java; data struct; algorithms; sw design; large syst sw design & dvlpmnt; Linux; database design & SQL; TCP/IP; & ntwrk program.

#1615.3589: compiler construct; parallel compute; prog lang design; compiler &/or tool dvlpmnt; Java; & C++.

#1615.1365: C++, distrib compute, ntwrkng, perf analysis & optimize, comp arch, Unix, debug, & sw design.

#1615.1793: C, C++, Java, or Python; data analysis; syst admin; large-syst design; ntwrkng; troubleshoot; stats; & reliability & prob solve approach.

#1615.4746: C& C++; Python; Shell script; distrib version control syst; Linux syst program & kernel dvlpmnt; distrib algorithms; & large-scale data process.

#1615.4782: oo analysis & design; prog skills in C++ or Java; UI design & implement; UNIX or Linux environ; data struct & algorithms; & sw dvlpmnt

#1615.1515: prog in one or more lang w/unit test, dependency, injection, & other test automation methodologies; debug & test automation across multiple computer pltfrms or browsers; large-scale codebase to perf refactor & improve codebase efficiency; design, dvlpmnt, test,& maint of multi-thread distrib syst or large-scale web syst; & data struct & algorithms used in test methodologies & automation.

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Hardware Engineer (Mountain View, CA) **#1615.4269**: Design, develop, modify, and/or test hardware needed for various Google projects. Exp incl: tech lead & troubleshoot hw dvlpmnt proj; prod dvlpmnt; & power design & distrib methodologies at board & syst level. Up to 10% trvl req'd.

Site Reliability Engineer; (Mountain View, CA); **#1615.673**: Design, develop, modify, and/or test software needed for various internet search engine company projects. Exp incl: prod launch; design & implement of sw syst incorporating storage & using ntwrk infrastruct; dvlpmnt in Java &/or C++; & lead eng'g teams.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various Google projects. Exp. incl:

#1615.472: CSS & HTML prog & troubleshoot; database syst & data mine; mach learn; C &/or C++; Java; & Jscript.

#1615.1710: C++, Java, &/or Jscript; Unix & Linux; data struct, algorithms, & sw design; database design & SQL; large sw syst dvlpmnt; & oo prog.

#1615.345: Java; adv Jscript; HTML5; CSS; Java servlet web frmwrk; dependency injection frmwrk; test frmwrk; sw release life cycle; & interface lang.

#1615.2986: sw design & dvlpmnt in C++ & Python lang; standard libraries, incl STL; large syst sw design & dvlpmnt; data struct & algorithms; UNIX shell script; parallel & distrib computing; large-scale data mine; large-scale data index & retrieval; sensitive or private data security, incl risk analysis, encryption, & access control; user profile, personalization, & recommend systems; & sw debug, code risk analysis, & perf optimization, incl for low-level assembly code.

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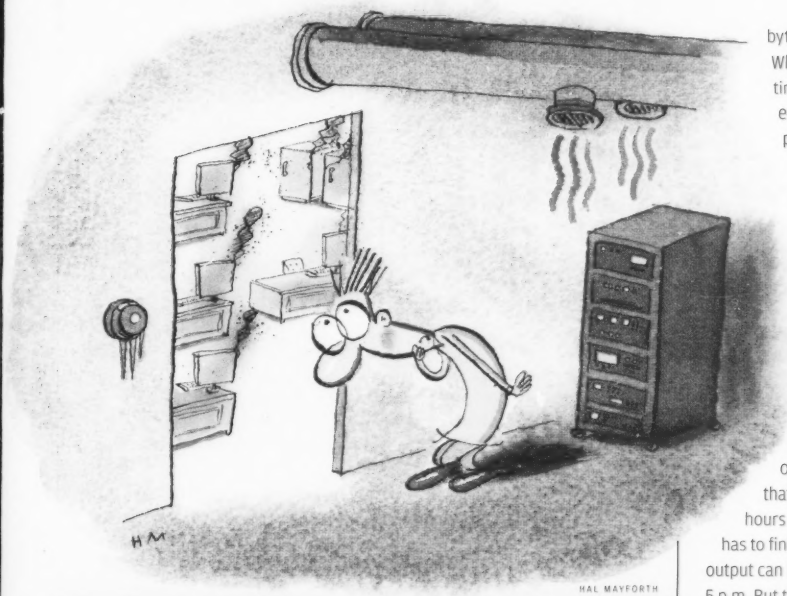

HAL MAYFORTH

Running Hot and Cold

It's the height of summer, and the combination of 110-degree heat and flaky power-line voltages make this data center's air conditioner highly unreliable. Fortunately, the server room also has a duct that brings in air from the large chillers that cool the rest of the office. But to keep the server room cool, those units have to run constantly. "No one really wants to come in on the weekend to open the vent if the AC goes out again," says a pilot fish on the scene. "But the building engineer has an idea: Leave the vent open and move the main AC unit's thermostat into the server room. The plan worked, and the server room stayed a nice, cool 70 degrees all weekend. Unfortunately, the building engineer neglected to turn off the heat function of the thermostat, which was set at 74 degrees. On Monday morning, it was nearly 115 degrees in the rest of the office, and we'd lost about 30 PCs and two refrigerators that were running over the weekend. The server room AC unit now has its own full online UPS and hasn't gone out since."

Nobody Said *Not* To

This pilot fish manages the mail servers for his company. "We had a cap on the size of email going to the Internet, but the bosses didn't want restrictions on internal mail," says fish. But one day, a mail server grinds to a crawl, and fish discovers that a user has copied almost her entire local drive and mailed it – as an attachment hundreds of megabytes in size – to herself. Why? Seems she was getting a new PC and apparently didn't trust IT support to copy everything to the new machine for her. Sighs fish, "We got permission to extend the size restrictions to internal mail that same day."

Priorities

Contractor pilot fish is tapped one December weekend to monitor a special, once-a-year payroll job that will need about four hours to complete – and it has to finish early, so that the output can be mailed out before 5 p.m. But two hours into the run, fish suddenly loses his connection to the mainframe. Turns out there's a network admin who *always* takes the network down at 2:30 p.m. on Saturdays to run weekly maintenance – and all fish's pleading falls on deaf ears. "I then politely explained to him that the job I was running was to calculate and print annual bonus checks for 180,000 employees all over the country," says fish. "And while I, as a contractor, wouldn't be receiving one of those checks, I told him that if he kept to his schedule, he'd better hope that none of the angry employees whose checks would be late would be able locate his home address and/or phone number. Ten minutes later, the network was restored."

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PRESTON GRALLA

Is Your Fridge an IRS Snitch?

BACK IN THE STONE AGE of the online privacy debate, in 1999, Sun's then-CEO, Scott McNealy, raised the hackles of privacy advocates when he said about being on the Internet, "You have zero privacy, anyway. Get over it."

If McNealy was right 13 years ago, then we have less than zero privacy today. And things are just going to get worse.

In 1999, some marketers might have been able to make hay by using your search history and browsing habits. Now, more than a decade after 9/11, the government can easily access those things, along with your text messages and emails, and it can, without a warrant, use your cellphone to pinpoint your location. And take a look at what's coming: One day, the devices in your home will gather and transmit information about the most intimate parts of your life. This will ostensibly be for your convenience ("Hi, Preston, it's your refrigerator. Did you know you're almost out of milk?"), but various government agencies are going to covet all that data. They're going to feel the same about all the personal documents we'll be storing in the cloud, just begging to be perused.

The courts and federal and state laws have not kept pace with the privacy issues raised by the fact that so much of our data exists in a realm beyond our complete control. And the limits on government's ability to access that data are not well defined. For example, in Louisiana, a federal appeals court is in the process of deciding whether the data gathered by your cellphone as it tracks your location constitutes business records that belong to the phone company or personal records that require greater privacy protections. Meanwhile, in Rhode Island, a judge disallowed evidence that police had gathered from cellphones, some with a warrant, because an officer had read a text message during the initial investigation into the death of a six-year-old boy without first getting a warrant. That case led Rhode Island lawmakers to approve legislation requiring the police to obtain a warrant prior to searching a cellphone, but the governor vetoed the bill, preferring to defer to the courts' discretion in such cases. And while much has been written about the downfall of David Petraeus, we have not reached consensus on what circumstances would justify the unobstructed access to personal email that the FBI utilized while investigating matters involving the former CIA director.

Though the law remains unsettled, we are all accelerating our exposure in the cloud. It's not just our Web browsing, our online searches, our cloud-based storage and our cellphones. Everything we download to an e-reader leaves a trace, and the same is true of streaming music and videos.

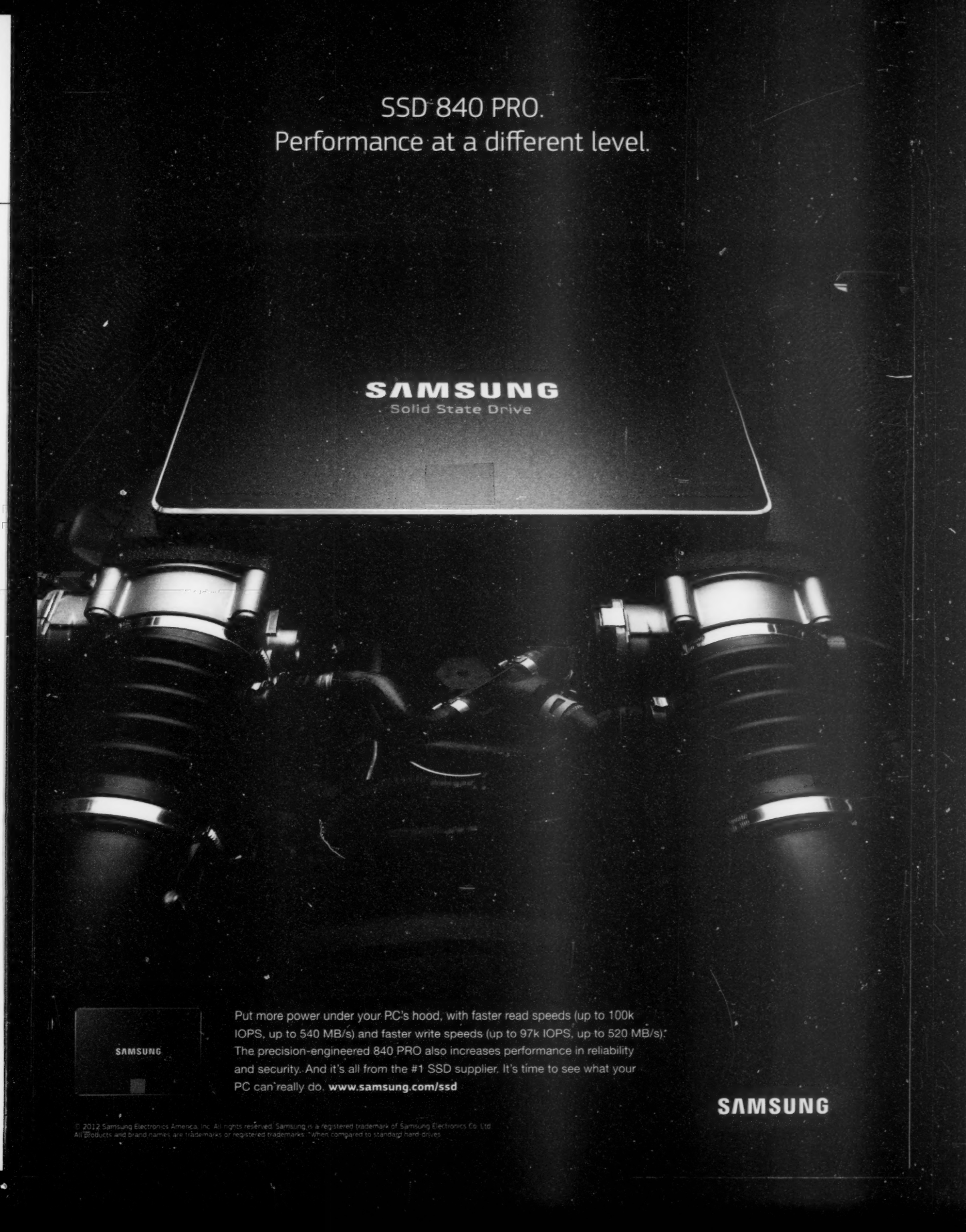
So, when you get down to it, what is going to keep your refrigerator from talking to the IRS? How is it, the taxman might want to know, that you report only $35,000 in income, yet your fridge is stocked with caviar and Dom Perignon?

A good place to start to clear things up would be with the Electronic Communications Privacy Act, which hasn't been updated since 1986. The Senate Judiciary Committee recently voted in favor of a change, written by committee chairman Patrick Leahy (D-Vt.), that would require agencies to show probable cause that you've committed a crime and obtain a search warrant before they can snoop on your cloud-based data. But that proposal is going nowhere this year, and the committee's ranking Republican, Chuck Grassley of Iowa, hints that he's not in favor of it.

Leahy is right and Grassley is wrong. Next year, Congress should adopt Leahy's amendment. If it doesn't, you'd better be careful about how you stock your smart fridge. ◆

Though privacy law remains unsettled, we are all accelerating our exposure in the cloud.

Preston Gralla is a *Computerworld.com* contributing editor and the author of more than 35 books, including *How the Internet Works* (Que, 2006).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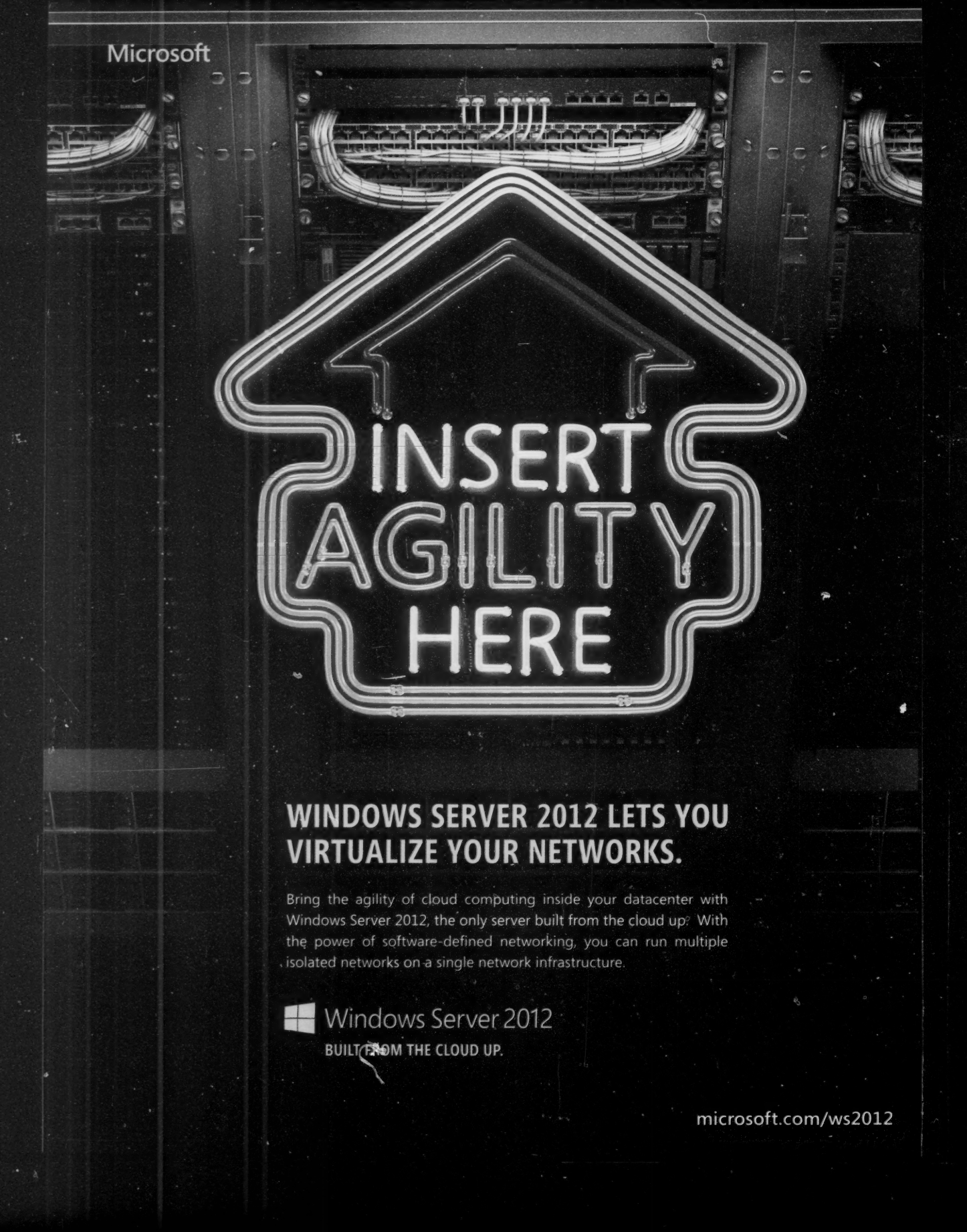
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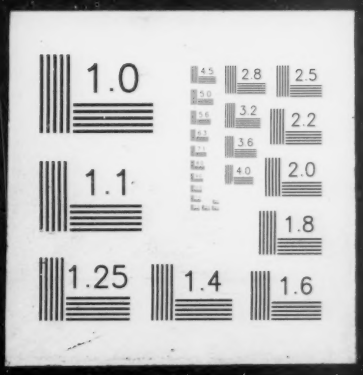
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